SRScales™
by SR Instruments, Inc.

Model SR575

Bariatric Stand-On Scale

Operating and Service Manual

Serial Numbers: 1000 +

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PACKING CHECKLIST – Model SR575
Bariatric Stand-On Scale

√	DESCRIPTION	QUANTITY
	BASE ASSEMBLY	1 ea
	MAST ASSEMBLY with DISPLAY and HEIGHT BAR	1 ea
	PACKAGE of SIX (6) "D" CELL BATTERIES	1 ea
	PACKAGE of FOUR (4) LEVELING FEET	1 ea
	3/8-16 FLAT HEAD SCREWS	4 ea
	3/8" NYLON INSERT LOCK NUTS	4 ea
	LOCTITE®	1 ea
	1/8" ALLEN WRENCH	1 ea
	QC INSPECTION SHEET	1 ea
	CALIBRATION CERTIFICATE	1 ea
	WARRANTY CARD	1 ea
	MANUAL	1 ea

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ASSEMBLY

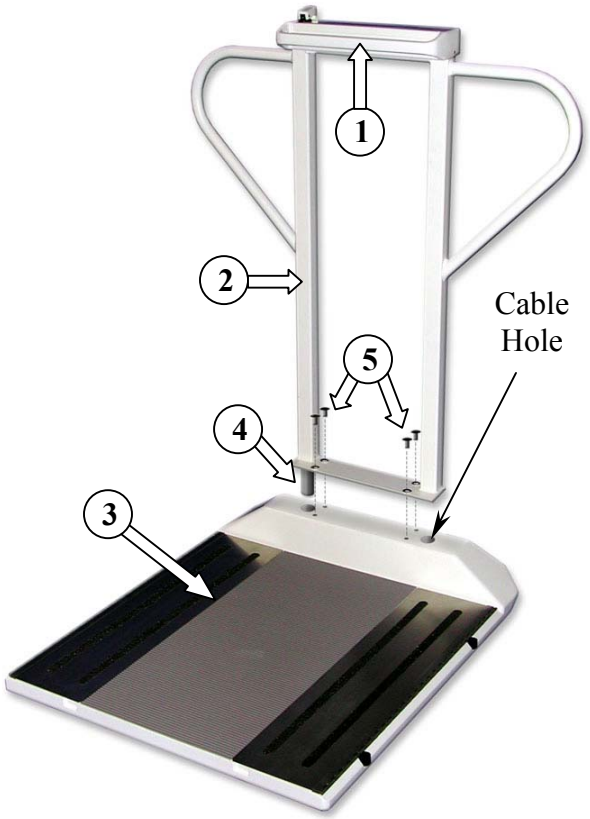

Figure 1: Scale Assembly Diagram

#	PART NAME
1	Display Unit
2	Mast Assembly
3	Base Assembly
4	Height Bar
5	3/8-16 Screws
6	3/8" Nylon Insert Lock Nuts
7	Height Bar Set Screws
8	Display Cable Connector
9	Battery Compartment Cover
10	Leveling Feet

STEP 1: Unpack the scale system and check parts against the **PACKING CHECKLIST**. If there are any missing or damaged parts, please call the Service Hotline: 1-800-654-6360.

STEP 2: (Figure 1) Position the Mast Assembly (2) into the Base Assembly (3) as shown, while feeding the display cable through the cable hole on the right. Ensure the Height Bar (4) seats correctly in the Base Assembly.

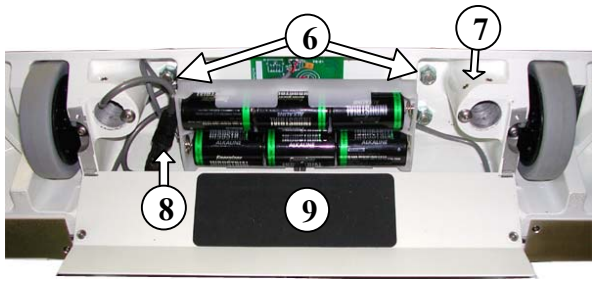

Figure 2: Display Cable Connector, Height Bar Set Screws, and Lock Nut Locations

STEP 3: (Figure 1) Insert the four (4) 3/8-16 screws (5) into the holes in Mast Assembly and Base Assembly as indicated.

STEP 4: Gently rest the scale on its side. Verify that the serial number on the bottom of the Display Unit (1) matches that on the Battery Compartment Cover (9), located in the Base Assembly between the wheels.

STEP 5: (Figure 2) Open the Battery Compartment Cover. Secure the Mast Assembly by screwing the four (4) 3/8"Nylon Insert Lock Nuts (6) onto the four (4) 3/8-16 Screws inserted in STEP 3.

STEP 6: Remove the Height Bar Set Screws (7) and apply a small amount of Loctite® to each. Reinstall setscrews and tighten securely.

Continued next page

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ASSEMBLY Cont'd

STEP 7: Attach the Display Cable Connector (8) to its mate in the Base Assembly. Slide the extra cable back up into the mast pipe.

STEP 8: Install the six (6) "D" cell batteries as indicated on the Battery Compartment Cover label. Tightly close the cover.

STEP 9: (Figure 3) Attach Leveling Feet (10) (separate package provided) to each of the four (4) corners of the Base Assembly. Screw the Leveling Feet approximately 1/2 inch into the hole of each of the four (4) transducer cells. **Note**: Leveling feet must be in place to operate the scale properly.

STEP 10: Return the scale to the upright position. Adjust Leveling Feet to ensure scale will sit level on the floor.

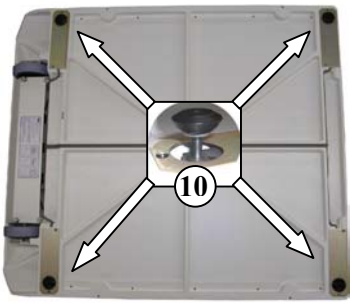

Figure 3: Leveling Feet Installation

REPLACEMENT PARTS and ACCESSORIES

	Part #	Description
1	ES7428	Display Label / Membrane Switch
2	MF2284T52	Leveling Foot

SYSTEM DESCRIPTION and INTENDED USE

SYSTEM DESCRIPTION

The SR575 Bariatric Stand-On Scale employs the latest in microprocessor and load cell technology to provide accurate and repeatable weight data. Four (4) identically matched transducers are strategically placed to ensure an accurate representation of the patient's weight.

The low power microprocessor circuitry allows the SR575 to derive its power from six (6) common "D" cell batteries, which will provide up to 10,000 weight readings before needing replacement. This eliminates the need for an external battery charger or the danger of an AC power supply cord on a portable scale.

The patient's weight is displayed on a 16-character dot matrix LCD. With a push of a button, weight data may be viewed in either pounds or kilograms with a displayed resolution of 0.1 for each.

INTENDED USE

The SR575 Bariatric Stand-On Scale is specifically designed for use as a portable patient weighing system for ambulatory and non-ambulatory wheelchair bound patients or those that need to be supported by a chair or walker. Maximum weight capacity must not exceed 1000 pounds or 454 kilograms gross weight.

⚠ WARNING ⚠

DO NOT EXCEED MAXIMUM WEIGHT LIMIT OF 1000 LB / 454 KG

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MAINTENANCE and CLEANING

The display case for the SR575 Bariatric Stand-On Scale is made of a powder-coated aluminum casting. Exercise caution when cleaning the display window as it is made of clear polyester and can be scratched by abrasive cleaners. Mild soap and water is recommended for general cleaning and disinfecting.

⚠ WARNING ⚠

DO NOT use pressurized water or steam. The scale system contains microprocessor circuitry and strain gauge sensors that may be adversely affected by exposure to such an environment.

STORAGE and TRANSPORTATION

STORAGE

If storing this equipment for periods longer than three (3) months, remove the batteries. To maintain proper operation of this instrumentation, storage and transport conditions should not vary outside the following conditions: Relative Humidity 0% to 85%, Ambient Temperature 14°F to 122°F (-10°C to +50°C).

TRANSPORTATION

To transport the SR575 Bariatric Stand-On Scale, lower the Height Bar, tip the scale back and wheel it to a new location. Lower the platform back down to the floor, being careful not to shock the scale.

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SPECIFICATIONS

MAXIMUM WEIGHT CAPACITY	1000 lb or 454 kg
PLATFORM SIZE	28 in x 28 in (71 cm x 71 cm)
INTEGRATED HEIGHT GAUGE	Telescoping gauge
DISPLAY TYPE	16-Character dot matrix LCD
DISPLAY RESOLUTION	0.1 lb or 0.1 kg
ACCURACY	0.1% +/- 1 digit of displayed resolution for calibrated range
AUTO ZERO	One button operation
AUTO POWER DOWN	After 35 seconds
HOLD	While active, freezes display data and stores it in memory
LAST WEIGHT RECALL	"Hold" button recalls last stored weight
AUTO HOLD	Locks display data and stores it in memory
AVERAGING	Automatic digital filter
POWER SUPPLY	Six (6) "D" cell batteries
CALIBRATION	Calibration is traceable to NIST standards.
OPERATING CONDITIONS	Normal operating conditions for this product: Ambient Temperature Range: 68°F to 85°F (20°C to 30°C), Relative Humidity Range: 0% to 85%. Avoid exposure to high-pressure water or steam.
TRANSPORT and STORAGE	Storage and transport conditions should not vary outside the following conditions: Relative Humidity 0% to 85%, Ambient Temperature 14°F to 122°F (-10°C to +50°C). Remove batteries if storing longer than three (3) months.
PATIENT APPLIED PART CLASSIFICATION	Type B

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BUTTON FUNCTIONS

ZERO

The "**ZERO**" button is used to zero the system before placing a patient onto the scale system. When pressed, the display message will indicate "**PLEASE WAIT**" "**HANDS OFF**". Ensure that nothing is in contact with the scale system during this procedure. The display will read "**WEIGHT 0.0 LB**" (or **KG**).

WEIGH

The "**WEIGH**" button wakes up the display and shows the patient's weight if it should Auto Power Down before the weighing process is done.

HOLD

The "**HOLD**" button freezes the displayed weight and stores it away in memory. Press "**HOLD**" to store the weight into memory. To recall last weight reading, press "**HOLD**".

LB/KG MODE

Weight data may be viewed in either pounds or kilograms. Pressing the "**LB/KG MODE**" button allows the operator to toggle between the two readings. Both pounds and kilograms are displayed in a resolution of 0.1.

BASIC SYSTEM OPERATION

SETTING SYSTEM ZERO

Make sure scale is free and clear of any obstructions and press the "**ZERO**" button. The displayed message will indicate "**PLEASE WAIT**" "**HANDS OFF**". Ensure that nothing is in contact with the scale while zeroing the system. In a few seconds, the display will read "**WEIGHT 0.0 LB**" (or **KG**). **Note**: If patient will be using a cane for support on the scale, place the cane on the scale while zeroing the system. This will ensure that the patient's NET weight will be displayed. It is recommended that the system be zeroed prior to each new patient.

After the scale has been set to zero, position the patient on the scale. The patient's weight will be displayed in either pounds or kilograms.

CONTINUOUS WEIGH

In this default mode, the weighing surface remains active. Press the "**HOLD**" button once to lock the displayed reading and store it in memory as the "last weight" for recall later.

Continued next page

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BASIC SYSTEM OPERATION Cont'd

AUTO-HOLD

This mode is for patients unable to remain still for the weighing procedure. It locks, stores, and displays the patient's weight as soon as the "**WEIGH**" button is pressed once. **Note**: No weight will be displayed until the button is pressed.

To enable this mode, before zeroing the system, press and hold the "**HOLD**" button for approximately five (5) seconds until the display reads "**AUTO-HOLD ENABLED**".

To return to CONTINUOUS WEIGH mode when finished, press and hold the "**HOLD**" button for approximately five (5) seconds until the display reads "**CONTINUOUS WEIGH**".

BATTERY REPLACEMENT

STEP 1: The display will read "**REPLACE BATTERY**".

STEP 2: (Figure 4) Tip the scale on its side and unscrew the two (2) screws from the Battery Compartment Cover located on the base of the unit, between the wheels.

STEP 3: Remove and replace ALL six (6) "D" cell batteries. Refer to Battery Compartment Cover label for placement.

STEP 4: Press the "**WEIGH**" button to confirm display is working.

STEP 5: Tightly close the cover.

STEP 6: Zero the system.

Figure 4: Battery Compartment

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THEORY OF OPERATION

SR Instruments patient weighing systems are digital scales. Strain-gauge force cells convert the force of an applied weight into an analog signal. This signal is amplified by an operational amplifier and converted to a digital signal by an analog to digital converter. The digital signal is transferred to a micro-controller where it is filtered, converted to appropriate units, and displayed on a liquid crystal display.

Strain-gauge force cells each contain four strain gauges mounted in a full Wheatstone-bridge configuration. These bridges convert the physical movement of the force cell, due to the applied mass on the system, into minute changes in electrical resistance. These changes in resistance produce a voltage difference across the Wheatstone-bridge, which is amplified by the operational amplifier. The amplifier is configured to current sum the output of each cell, with potentiometers serving to adjust the sensitivity (voltage out per unit of weight applied) of each bridge. The offset potentiometer produces a small current, which nulls the output of the amplifier for an unloaded system.

The output of the operational amplifier is digitized by the analog to digital converter. The converter integrates the analog signal onto the integrating capacitor over a short interval. The integrating capacitor is then discharged at a rate proportional to the reference voltage applied to the converter. The residual voltage on the integrating capacitor is then multiplied by a factor and again discharged at a rate proportional to the reference voltage. The residual voltage from this discharge is again multiplied by a factor and again discharged. The time taken to discharge the capacitor is proportional to the voltage from the operational amplifier, which is proportional to the applied load on the force cells. The time is stored as a binary number in the analog to digital converter and is transferred to the micro-controller when the conversion is complete.

The micro-controller averages and filters the digital output of the analog to digital converter, subtracts the value saved during the system zero operation and scales the filtered output, then displays the result on the liquid crystal display. The micro-controller performs a rolling average of data for continuous weigh and, for AutoHold, the micro-controller averages the data before locking in on the reading. If the data variance is greater than 0.1% in the AutoHold mode, the micro-controller will reset the filter and start a new averaging period.

The micro-controller can be placed in a calibration mode, where the system can be re-calibrated. In the calibration mode, the result of the weigh operation is scaled to match the value by adjusting the “up” and “down” calibration buttons. This new calibration factor is then stored in the non-volatile memory.

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CALIBRATION

IMPORTANT

CALIBRATION CHECK - Qualified service personnel only should perform this procedure. Load cells have no user serviceable components and should not be tampered with for any reason. Re-calibration is generally not required, but should be verified periodically to ensure accuracy. Recommendation for calibration check is at least once every 12 months, or as individual maintenance policy requires.

Figure 5: Location of Hidden Calibration Buttons

Note: Ensure that nothing is in contact with the scale system during this procedure. Remove hands from the system when noting the displayed calibration results.

STEP 1: (Figure 5) Simultaneously press and hold the hidden calibration buttons on the label ("+" and "**-**")**.** The display will read "**HOLD TO CAL**" as the right hand digit counts down from 9 to 0 to enter the CAL mode.

STEP 2: When in the CAL mode, press the "**ZERO**" button to zero the display.

STEP 3: Place a known calibrated weight, traceable to NIST, onto the weighing surface and compare it to the displayed reading. **Note**: DO NOT USE barbell weights or calibrate to a mechanical scale.

STEP 4: Use the "+" and "-" buttons to make any necessary adjustments to the displayed value. The displayed value should be within 0.1% of the calibrated weight, plus or minus 1 digit of reading.

STEP 5: When adjustments are completed: Press the "**HOLD**" button to SAVE the settings, or press the "**WEIGH**" button to CANCEL. Both choices will EXIT the CAL mode.

CALIBRATION TOLERANCE TABLE

LOW LIMIT	APPLIED LOAD	HIGH LIMIT
99.9	100.0	100.1
199.8	200.0	200.2
299.7	300.0	300.3
399.6	400.0	400.4
499.5	500.0	500.5
599.4	600.0	600.6
699.3	700.0	700.7
799.2	800.0	800.8
899.1	900.0	900.9
999.0	1000.0	1001.0

CAUTION

ESD: The integrated circuits and semiconductors on the printed circuit boards may be damaged by electrostatic discharge (ESD). Be sure to use proper handling precautions at all times.

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INITIALIZATION

INITIALIZATION PROCEDURE
To be used ONLY IF REPLACING IC5 or if DISPLAY READS DOUBLE

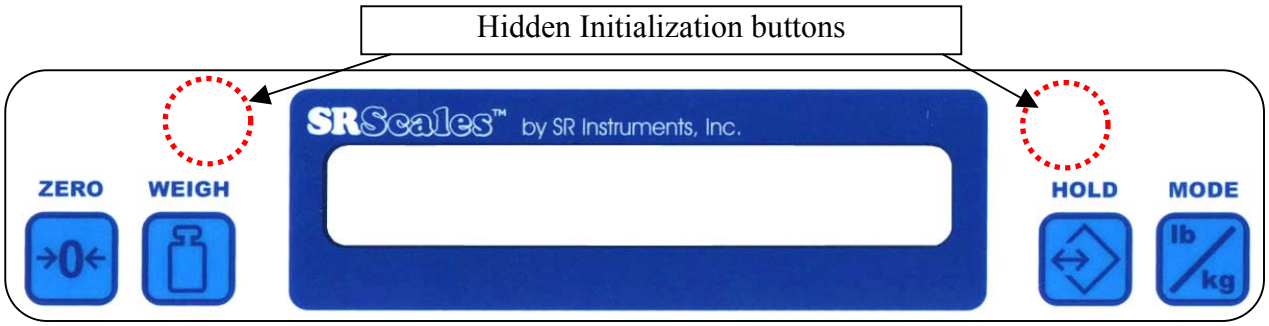

Figure 6: Location of Hidden Initialization Buttons

STEP 1: (Figure 6) The Initialization buttons are hidden in the label in the positions indicated.

STEP 2: Simultaneously press buttons indicated to initialize the system. The display will read, "**HOLD TO INIT**" and count down from 9 to 0. When initialization is complete, the display will read "**INITIALIZING**" and then return to the WEIGH mode.

STEP 3: Follow the **CALIBRATION** procedure.

⚠ CAUTION ⚠

ESD The integrated circuits and semiconductors on the printed circuit boards may be damaged by electrostatic discharge (ESD). Be sure to use proper handling precautions at all times.

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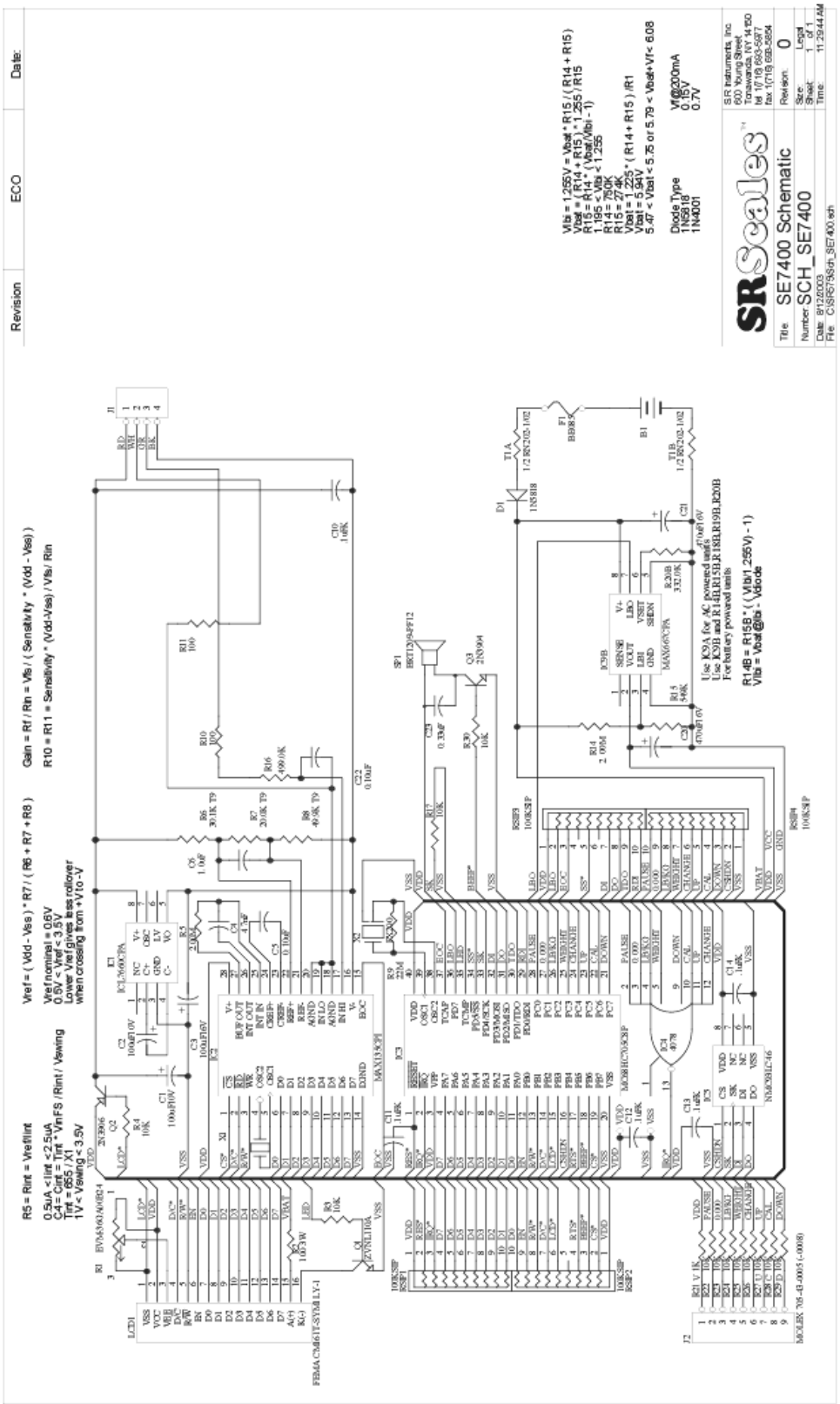
ELECTRICAL SCHEMATIC


SRScales
SE7400 Schematic
SCH_SE7400
Revision
ECO
Date:
Vref = (Vdd - Vss) * R7 / (R6 + R7 + R8)
Gain = Rf / Rin = Vfs / (Sensitivity * (Vdd - Vss))
R10 = R11 * Sensitivity * (Vdd-Vss) / Vfs / Rin
R5 = Rint = Vref/Iint
0.5uA < Iint < 2.5uA
C4 = Cint = Tint * VinFS /Rint / Vswing
Tint = 655 / X1
1V < Vswing < 3.5V
Vref nominal = 0.6V
0.5V < Vref < 3.5V
Lower Vref gives less rollover
when crossing from +Vto -V
Vfs = (1.255 * Vbat * R15 / (R14 + R15)) - (Vbat * (R14 + R15) * 1.255 / R15)
R15 = R14 * (Vbat/Vfs - 1) / 1.255
R14 = 2.00M
R15 = 274K
Vfs = 1.225 * (R14 + R15) /R15
Vbat = 5.94V
5.47 < Vbat < 5.75 or 5.79 < Vbat+Vf < 6.08
Diode Type
1N5818
1N4001
Vf@200mA
0.15V
0.7V
Use JC9A for AC powered units
Use JC9B and R14&R15JR18BLR19B,JR20B
For battery powered units
R14B = R15B * ((Vbat/1.255V) - 1)
Vbat = Vbat@fs - Vdiode
SR Instruments, Inc.
600 Young Street
Tonawanda, NY 14150
tel (716) 693-5977
fax (716) 693-5854
Size: Legal
Sheet 1 of 1
Time 11:29:44 AM
Date: 8/12/2003
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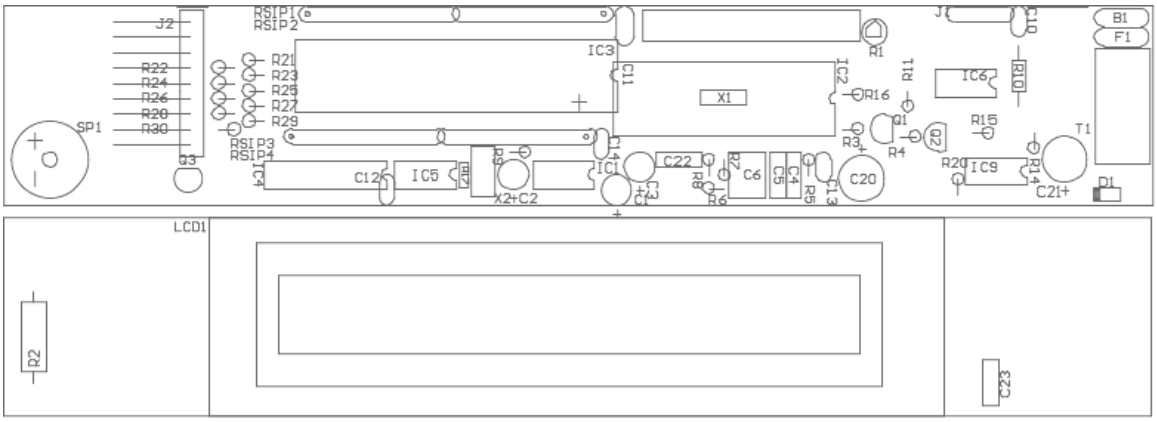
PC BOARD LAYOUT



COMPONENT LIST

PART	DESCRIPTION	POSITION
SE7400	DISPLAY ASSEMBLY 575	
EC347RM50	.0047MFD P3472-ND DIGI-KEY	C4
EC510RF	0.1MFD #SR205C104KAA (AVX)	C10,11,C12,C13,C14
EC510RM050	.1MFD #R82104J63B (NISSEI)	C5,C22
EC533RM	.33MFD #B32529-C334J	C23
EC610RM050	1MFD #168105J50G (MALLORY)	C6
EC810RE016	100MFD.	C1,C2,C3
EC847RE016	470MFD RADIAL (UVX1C471M)	C20,C21
ED1N5817	DIODE (MOTOROLA)	D1
EICD4078BE	IC #CD4078BE (TI)	IC4
EIDIP14	SOCKET,14 PIN #DILB04P-223T	IC4
EIDIP28	SOCKET 28 PIN #DILB-28P-223T	IC2
EIDIP40	SOCKET 40 PIN (FCI)	IC3
EIDIP8	SOCKET 8 PIN (FCI)	IC1,IC5,IC9B
EIMAX135CP	IC #MAX135CPI (MAXIM)	IC2
EIMAX667CP	IC #MAX667CPA (MAXIM)	IC9B
EINM93C46N	IC #93LC46B-I/P (MICROCHIP)	IC5
EITC7660CP	IC #TC7660CPA (TELCOM))	IC1
EPCB1857C2	PC BOARD 1857 REV C2	
ER21005QF	100 OHM 1/4 WATT 5% RESISTOR	R10,R11
ER21005W3	100 OHM 3 WATT 5% RESISTOR	R2
ER31005QF	1K 1/4 WATT 5% RESISTOR	R21
ER41005QF	10K 1/4 WATT 5% RESISTOR	R3,4,17,22,23,24,25, 26,27,28,29,30
ER42001EJ	20K 1/8 WATT 1% J RESISTOR	R7
ER43011EJ	30.1K 1/8 WATT 1% RESISTOR	R6

Continued next page

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COMPONENT LIST cont'd

ER44991EJ	49.9K 1/8 WATT 1% J RESISTOR	R8
ER54991EJ	499K 1/8 WATT 1% J RESISTOR	R16
ER55491ED	549K 1/8 WATT 1% RESISTOR	R15
ER62004EJ	2M 1/8 WATT 1% J RESISTOR	R5,R14
ER72205QF	22M 1/4 WATT 5% RESISTOR	R9
ER770101	RESISTOR NETWORK 100K	RSIP1,2,3,4,RSIP4
ESRUE090	SWITCH, POLY (RAYCHEM) #RUE090	F1
ET2N3906	TRANSISTOR 2N3906 (MOT)	Q2,Q3
ETZVNL110A	TRANSISTOR, VOLTAGE REF.ZVNL110	Q1
EV25KKVSF8	20K POT	R1
EW1551B	WIRE 22AWG BLACK (ALPHA)	LCD1-16
EW1551R	WIRE 22AWG RED	LCD1-15
EXPX200	CERAMIC RESONATOR #PX200MC	X2
EXRN202-1.5	CHOKE (SCHAFFNER)	T1
EXSE3201	CRYSTAL 32.768 KHZ (EPSON)	X1
FCBSW11404	TERMINAL STRIP #BSW014-04-G-S	J5A
FCHTSW10912	TERMINAL STRIP (SAMTEC)	J2

TROUBLESHOOTING

SYMPTOM	REASON/CORRECTIVE ACTION
Inaccurate weight readings	Scale system MUST be zeroed with empty wheelchair BEFORE patient is positioned in the wheelchair and onto the scale (see directions for **BASIC SYSTEM OPERATION)**.
The characters only appear on half of the display	Press the "**WEIGH**" button or remove one battery. Wait five seconds, then re-install the battery and try the "**WEIGH**" button again.
The display lights appear to work, but do not respond to button activation	Membrane switches in the label may be damaged. Make sure PENS or PENCILS are NOT used to press buttons.
The display shows no reading at all	Check to ensure batteries are installed correctly (see directions for **BATTERY REPLACEMENT)**. Check display cable to make sure it is connected securely.
For additional information or assistance, telephone the Service Hotline: 1-800-654-6360 or e-mail: sri@srinstruments.com	

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WARRANTY

TWO (2) YEAR LIMITED WARRANTY

Each **SR**Scales™ system is manufactured with high quality components. SR Instruments, Inc. warrants that all new equipment will be free from defects in material or workmanship, under normal use and service, for a period of two (2) years from the date of purchase by the original purchaser. Normal wear and tear, injury by natural forces, user neglect, and purposeful destruction are not covered by this warranty. Warranty service must be performed by the factory or an authorized repair station. Service provided on equipment returned to the factory or authorized repair station includes labor to replace defective parts. Goods returned must be shipped with transportation and/or broker charges prepaid. SR Instruments, Inc.'s obligation is limited to replacement of parts that have been so returned and are disclosed to SR Instruments, Inc.'s satisfaction to be defective. The provisions of this warranty clause are in lieu of all other warranties, expressed or implied, and of all other obligations or liabilities on SR Instruments, Inc.'s part, and it neither assumes nor authorizes any other person to assume for SR Instruments, Inc. any other liabilities in connection with the sale of said articles. In no event shall SR Instruments, Inc. be liable for any subsequent or special damages. Any misuse, improper installation, or tampering, shall void this warranty.

DAMAGED SHIPMENTS

Title passes to purchaser upon delivery to Transportation Company. Any claims for shortage or damage should be filed with the delivery carrier by purchaser.

RETURN POLICY

All products being returned to SR Instruments, Inc. require a Return Goods Authorization number (RGA). To receive an RGA, call our Technical Service Team at 716-693-5977 or toll-free in the USA and Canada at 800-654-6360.

When inquiry is made, please supply model and serial numbers, purchase order, if the scale was bought on contract, and reason for return.

Generally, deleted, damaged, and outdated merchandise will not be accepted for credit. A minimum restocking charge of 15% will be assessed on return of current merchandise.

All returns are to be shipped FREIGHT PREPAID to: SR Instruments, Inc., 600 Young Street, Tonawanda, NY 14150.

RESTOCKING FEE

- **15% fee** for any scale that has been opened and used
- **10% fee** for any scale returned that has been ordered incorrectly or refused delivery with no model change
- **5% fee** if an error in ordering has been made and a different model exchanged
- **No fees** will be charged if the scale is returned because of an error on the part of SR Instruments, Inc.
- **No returns** accepted after 60 days.

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NOTES

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SRScales™
By SR™Instruments, Inc.

Precision & Technology in Perfect Balance™

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